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# PROBLEMS IN INFORMATION SYSTEMS DEVELOPMENT

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## ABSTRACT

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The purpose of this thesis is to find the general problems in information systems development. In the thesis, the author will first introduce the research approach of analysis needs, and then talk about the basic idea of an information system and information system development as well as the process of information system development. After the literature review of the topic, the author will find the problems depending on each process. Finally, the study case will be connected to declare the topic.

Information technology has been an indispensable part of the business life circle. It is common in companies or organizations. An information system is designed to provide the best possible information to users. Central access, easy back up, the central distribution of information, easy record keeping, easy tax preparation, as well as easy customer trait identification, are just a few of the benefits offered by an information system. Such a good tool always faces lots of problems during the development. What the author will focus on is the problems in information systems development.

**Key words:** Information System, Information System Development, Problems, Factors

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# 1 INTRODUCTION

An information system has been an efficient tool in this information age. But it always faces a lot of problems in the development processes such as the project becoming obsolete and exceeding budget. The most general problems in information system development are low productivity, a large number of failures and the inadequate alignment of information systems with business needs. (Tolvanen, Juha-Pekka , 1998)

Low productivity exists in every industry. What is the productivity in information system development? Information system development is based on the people, the knowledge of these people and the management of the knowledge. So the reasons for low productivity are the same as those for the low productivity of the developers. The reasons can be divided into several categories: non-competence, unclear productivity standards, work processes, poor team project management, work techniques, lack of motivations, complex tools and mixed maintenance.

Large numbers of failures mean the success rate is low. So what causes the information system development failures should be considered in this thesis.

The inadequate alignment of information systems with business needs means the output of the project doesn't match the requirements of customers. This is a very serious problem. Even though you have done your development, if it is not what the customers want, your work will be calculated as zero.

In this thesis, the author will talk about these three general problems and see how these problems are shown in real life.

## 2 RESEARCH PLAN

### 2.1 Research problem and research question

Information system is an efficient tool in business. It can save resources and improve the productivity of organizations. Information system also can support the management of business processes. But such an efficient tool always faces lots of problems during the development.

Under this background, the research problem is defined as what are the general problems in information systems development. Depending on the analysis of the research problem, the author will also give a conclusion that how to avoid them in the end of this thesis. Next, the author will introduce the research method.

### 2.2 Qualitative research method as a relevant

Qualitative research is a method that you should first get the fundamental theory, then collect data and check that if the data support your theory basis.

According to the research question, General Problems during Information Systems Development, the author will first establish the theory basis from the literature review. Then the author will go to the study case to collect data and analyze these data if they support the established theory. Finally, the author will get the conclusion if the theory basis is correct.

In another point of view, different kinds of problems are author's data. The problem description cannot be quantitative data. So the qualitative research method is a better choice than the quantitative method for this thesis.

### 2.3 Research framework

The thesis starts with the literature review of Problems Information System Development. Here, the first concept is an Information System. Information Systems are everywhere. When we go to a restaurant, the order delivery system is an information system. When we book a sauna time unit, the booking system is an information system. When we rent a car, the car renting system is an information system. These are some simple information systems. In work life, there are also many advanced information systems such as enterprise systems, office automation and so on.

The second concept is Information System Development. Information system development goes always with projects. To do the good information system development, the project group needs professional knowledge in both the information system area and the project management area.

Then the next concept is the processes of Information System Development. The basic information system development life cycle includes analysis, designing, implementation, testing, evaluation and reanalysis. A standard development method should follow this cycle to develop a system.

The last concept is the problems during the Information System Development. Lots of problems can be found in the development. In the literature review, the author will pay attention to the problems and their factors analyses.

The framework starts with reasons of these three main general problems. The reasons of low productivity are non-competence, unclear productivity standard, work process, poor team management, work technique, lack of motivations, complex tools and mixed maintenance. The reasons of a large number of failures can be divided into these four categories: correspondence failure, process failure, interaction failure and expectation failure. The reasons for an inadequate alignment of information systems with business needs can be divided into these four areas: business strategy, IT strategy, organizational infrastructure, information system infrastructure and processes.

The following is the framework diagram.

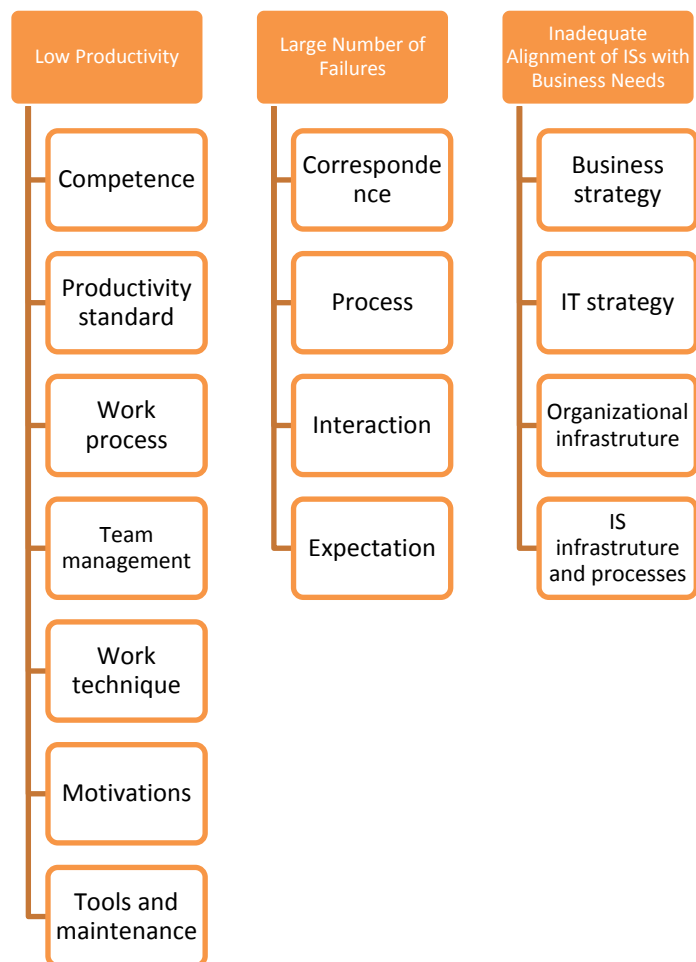


Figure 1 Framework

## 2.4 Data collection methods

Reports and some other related documents are author's research data. The author will document the process of interviews, personal notes, feedbacks and memos. And then, the author will also record reflections and ideas during the process. Finally the author will write down ideas and make plans.

The author can get data by at least three methods. The first method is interviews. The author tries to get the data from phone interviews or face-to-face interviews. Otherwise, the author also can send Emails to ask the company what the most



general problems during information systems development are. The second method is the observation. The author will pay attention to the company's strategy and plan, and combine them with their development processes to collect data. This may take lots of time and the processes are difficult to be known. The author will try to get data in the company which the author is familiar with. The last method is documents. Every company has open sources such as the policy, strategy plan and the basic company information. The author tries to collect data from the Internet. And the case company is where the author took the practical training. The author's own experiences will be a part of research data.

## 2.5 Research Approach: Deductive Study in Nature

Depending on the research problem, the general problems during the information systems development, the author will have a deductive study for the data analysis.

According to the research problem, the general problems during the information systems development, the author should first find the theory which has been made before. This is a quick and convenient method to solve the research problem. In another hand, the inductive study is difficult to implement. Research data is collected when the problems have happened already, we cannot say that you will have these problems as the conclusion. So, the inductive study cannot be used. In this situation, the deductive study is the best method for this thesis.

Firstly, the author will find different general problems during the information system development. Secondly, the author will study the factors what may cause the problems according to the theory. Then, all the records summarized from interviews and meetings will be reviewed. Finally, depending on the previous work, the author will analyze the data in the case company and compare the environment of the information system development to analyze the reasons of problems happening. This is the data analysis method and deductive study process in this thesis. Next the author will introduce the research process in this study.

## 2.6 Research Process

In this thesis, the author will first study the fundamental knowledge such as the definition of an information system and IS's purpose, information system development and ISD's processes. After this, the author will have a literature review of the general problems in the information system development. In the literature review, the author will learn the related theory and factors for these problems and then take the suitable theory to continue the deductive study.

This is the theoretical study part. The author will go to the empirical study part. After the literature review and theory establishing, the author will select the case company and collect data. Then, the author will compare the theory and data to test if this theory works in the case company. Finally, the author will give the conclusion. That's all for the research process. In the next chapter, the author will introduce the literature review.

### 3 PROBLEMS DURING INFORMATION SYSTEMS DEVELOPMENT

#### 3.1 Fundamental Knowledge

##### 3.1.1 Defination of Information System

Information systems are formal, social technical, organizational systems designed to collect, process, store, and distribute information. (Wiley, John & Sons, 2012)

An information system can help companies or organizations to achieve their business needs. For example, ERP system can help the organization to manage resources. An information system also can connect the outsourcing. It can import the system that they don't have into the company. To support the business process, the best way is to develop information systems.

This is the basic definition for an information system. Next the author will introduce the purpose of an information system.

##### 3.1.2 Purpose of Information System

People cannot be alive without information. We can get information by viewing television, searching the Internet and reading newspapers. In business, a company needs to get information and makes decisions. When the company makes decisions, the manager who makes the decisions needs information to help him/her to judge the situation and make the correct decisions. The correct information can help the manager get the correct decision. A company can manage information by an information system.

The purpose of an information system is to support business processes. To solve problems and make decisions, companies or organizations use information systems to support their business process, such as electronic commerce, booking flights,

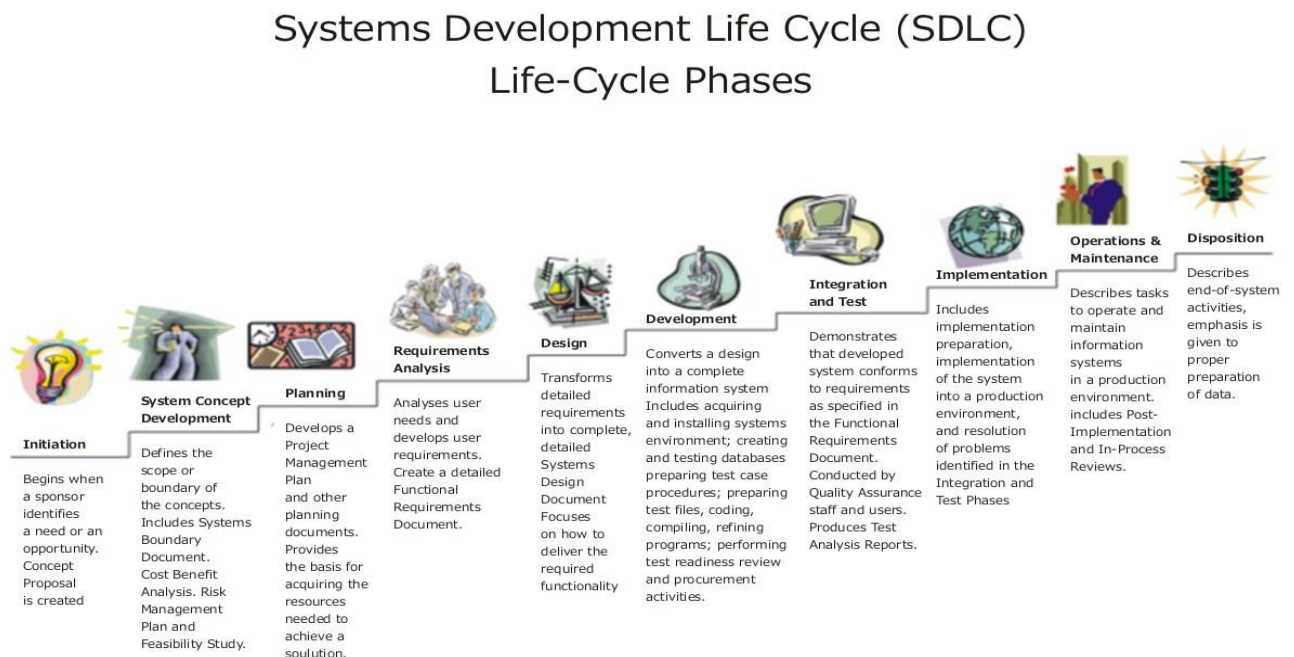
Internet meetings and so on. As a manager of the organization, you should know the basic information system knowledge to earn benefits. (Oz, Effy, 2008)

This is the purpose of constructing an information system. Next the author will introduce the information system development.

### 3.1.3 Information System Development

Information system development is a change process taken with respects to object systems in a set of environments by a development group using tools and an organized collection of techniques collectively referred to as a method to achieve or maintain some objectives. (Welke, R.J., 1981)

Most large companies or organizations have information system development groups. These groups can be their own or outsourced by corporations. Lots of methodologies can be used during information system development such as System Development Life Cycle (SDLC) which contains: analysis, designing, implementation, testing and evaluation. The following picture can show the phases of this model:



This is the introduction of information system development. The next will be the process of information system development.

#### 3.1.4 Process of Information System Development

The first step is problem recognition and specification. For an old system, firstly developers should recognize what problems it has and specify the new features that the new system should have. The factors for problems should be considered from both internal and external point of view. The second step is information gathering. This means gathering information from different parts. The third step is requirement specification for the new system, which means making the requirements for the new system. What should the new system be able to do should be documented. The fourth step is system designing. This means you should design the system depending on the requirements. The next step is system construction and making the plan into work. Then the next is system implementation to implement the new system into work life. The last step is reviewing and maintenance to check if the system works well and maintain it. There is a sentence in Chinese said that, “Producing takes 70 percentages and maintenance takes 30 percentages”. How to use and maintain the system is also very important.

### 3.2 Literature Review

The information system has been very popular as its powerful abilities. But it also faces lots of problems during the information system development. The three most general problems defined by Juha-Pekka Tolvanen are low productivity, a large number of failures, and the inadequate alignment of ISs with business needs. (Tolvanen, Juha-Pekka , 1998)

Low productivity has been recognized in the term “software crisis”, as indicated by the development backlog and maintenance problems. (Brooks, F., 1975) The ability to develop information systems cannot match the speed of it increasing. When we develop them, they may lose the timeliness.

Then the second problem is a large number of failures. The survey according to the Standish Group (1995) says that only 16% projects are delivered on time and within their budget. So, the other 84% projects are canceled or delayed. This is a huge failure of information system development. The author will analyze this in the next chapter.

The last general problem is the inadequate alignment of ISs with business needs. While an increasing part of organizations' resources is spent on recording, searching, refining and analyzing information, the link between ISs and organizational performance and strategies has been shown to be dubious. (Smith, H.A. & McKeen, J.D., 1993) Although the information system development depends on the organizations' needs, but the result always be unsatisfied.

### 3.2.1 Low Productivity

#### 3.2.1.1 Low Productivity Definition

There had been lots of phenomena for productivity problems since the middle 1980s during information system development projects. These problems were always that the project became obsolete and exceeded budget. (Boehm, B., 1987) In that period, many information system developers said that the information system went into a crisis of software and systems. (Brooks, F.P.J., 1995) To solve this problem, lots of developers aimed in improving the quality and productivity of software to achieve the improvement of the information system's productivity. (Keil, M. & Robey, D., 1999) Although they made forces to solve problems, problems were much more than before as the time moving forward. Information system development was always with many difficulties and problems, and most reasons for these are social. (Lyytinen, K., 1987)

A productivity definition from the Internet is a standard and measurement for the efficiency of producing process. Productivity is a rate of production output to input.

The measurement of productivity is defined as a total output per one unit of a total input. Not all the output can be considered in this definition. Only the output which matches the process requirements can be calculated into productivity. The strategic uses of information systems include the identification of new business opportunities and the improvement of value to customers.

Information system can improve productivity when the structure of company or organization uses new technologies. Research shows that different organizations and sub-organizations have different goals and strategies. There is no method that can make the different companies or organizations success in their information system development at the same time. In this situation, it is necessary to declare the responsibilities for each member in the organization. The group must declare the rights, privileges, time using and liabilities for people.

Productivity from information technology requires improvements in data gathering, quality analysis, integration, and aggregation stages. (Productivity From Information Technology, 2012)

**Data Gather:** Information system development cannot be without information. The useful and correct information can improve the productivity of information system development. As known, data makes up information. How to collect and gather data is a factor for productivity. For example, now people can check the amount left by the net bank service. The process that the account information is transferred from the bank database to user's screen is data gathering. If this process takes one hour, we can image that what a poor productivity of this net bank system is.

**Data Quality:** Data doesn't have any quality in general. But the object oriented data has quality. The data should be useful for information system development. In another words, the data should be easy to analyze and measure. For example, if you get a list of players to know who is the best, the data has been sorted is more quality than the data without being sorted.

**Data Interpretation and Aggregation:** A logical and clear data interpretation and aggregation can improve the productivity of information system development. The

author will use an example to explain this. If a person has lots of data items such as the analysis for the possibility of a method, but what he needs is to know that if this method can be used or not. So, he just needs to interpret this data as “This method is available except some cases”. In this sense, the logical and clear data interpretation and aggregation can improve the productivity of information system development.

### 3.2.1.2 Reason Analysis

The reason can be divided into seven items: non-competence, unclear productivity standards, work processes, poor team project management, work techniques, lack of motivations, complex tools and mixed maintenance. (Teambuildinginc, 1997)

Non-competence: Team members don't know what should they do and how should they do their jobs. In another words, the border of their responsibilities is not clear. To solve this problem, the project manager should declare the border of responsibilities for group members in the project plan.

Unclear productivity standard: Sometimes team members don't know what a good productivity is because no one gives them the guidelines or standards of a good productivity. And the standard may be not clear for each member. The team should discuss productivity standards before starting projects. Everything new or the purpose of product/service should be delivered to members to make everyone know their basic standards.

Work process: sometimes, the team doesn't have a defined work process. This makes the process unclear to the team members. The team may also forget to meet and draw a flow chart of their work process in as much details as possible.

Poor team project management: some teams seem that they don't struggle with the project. This means the project manager lacks management skills. In 1980's, most managers just assigned the tasks and then hoped them can be done as their expectations. This is a totally wrong method to manage a project. Management needs lots of skills such as human resource management skills. Poor team project



management will decrease the productivity during information system development.

Work techniques: New team members may not know the details of the team when they develop an information system. Every team has its own advantages such as pretty hobbies, strength parts and so on. This kind of advantages can be delivered by the previous members of this company or organization. If not, this advantage will disappear. So the work technique is also a factor for low productivity.

Lack of motivations: Team motivation is also an important factor for low productivity. Each process of information system development is done by people. The productivity of people is the key factor for the productivity of information system development. If the developer is happy and with a nice mood when he/she develops the information system, the productivity of this people will be much higher than when he/she is in a negative mood. If the productivity of developers is changed, the whole productivity of information system development will also be changed. As above, the author can say that lack of motivations is a factor for the low productivity of information system development.

Complex tools and mixed maintenance: Every information system development cannot be without right tools. For example, when you develop the website, you should use the tool which can help you to read the file in the server and use the tool that can edit code friendly. The right tools will help developers improve efficiency. So complex tools and mixed maintenance are factors for the low productivity of information system development.

### 3.2.2 Large Number of Failures

#### 3.2.2.1 Failures Phenomena

“The problems that what are the proportions of the developing countries information system projects fall into each of the three outcome categories are hard

enough to answer in the industrialized countries. There, at least, a certain level of surveys, evaluations, and analysis is present.” (Korac-Boisvert,N. & Kouzmin,A., 1995) The survey shows that 20% - 25% of the industrialized-country information system projects fall into the total failure category. 33% - 60% of them fall into the partial failure category. And only few projects fall into the success category.

The following is a table of the collected result of a survey by the Standish group to show the result of projects. By this table, the author can get the idea that the success rate is really low. The project challenged and the project failure take a large rate when develop an information system.

Standish Report	Project Success	Project Challenged	Project Failure
1994	16%	53%	31%
1996	27%	33%	40%
1998	26%	46%	28%
2000	28%	49%	23%
2004	29%	53%	18%
2006	35%	46%	19%
2009	32%	44%	24%

Figure 2 Standish Report: Success Rate of Projects

There are lots of evidences and reasons can be found via the Internet, such as lack of professional skills and human resource management, to support the statement that failure rates in developing countries are higher than developed countries. The evidences are:

- Lack of literature in general: During recent years, most developers in developing countries have a poor literature review before starting development. Although they don't have any experience on information system development, they don't have a worldwide sight to see how this development should go or they just follow one method but this method cannot be evaluated by other people. The next the author will talk about the evaluation.

- Lack of evaluations: The people who have the professional knowledge to evaluate the information system development always lack resources and capacity. The people who have the resources and capacity always lack professional knowledge. For example, academics have the professional knowledge to evaluate the system development, but most of them lack resources and capacity in real life. Aid donor agencies have the resources and capacity, but they lack professional knowledge.
- Focus on case studies: Literature review is very important in information system development just as mentioned in the previous item. But the theoretical part is not enough, the practical case study is also very important. Knowing how to implement the theory in the development life cycle can improve the productivity of information system development.

These are the phenomena for the failures of information system development. In the next sub-chapter, the author will show you system failure notions.

#### 3.2.2.2 System Failure Notions

There are four major notions or categories of information system failures defined by Lyytinen and Hirschheim.

**Correspondence failure:** Correspondence failure happens when the system design doesn't reach objectives. Even though goals and requirements are clear for the development group, the customers may not accept the system necessarily. For example, the goal of the project is to design a shopping cart. But the final output doesn't have the function removing items from the shopping cart. This failure can be called correspondence failure.

**Process failure:** Process failure happens when the development becomes absolute and exceeds budget. It means that the group doesn't finish the project with the limited time and limited money. This is a project level failure in information system development. For example, the project should be finished in two months and with five thousand euro. If the project group doesn't achieve this, the failure can be called process failure. The following two tables made by the Standish group show this process failure exactly.

Time Overruns	% of responses
Under 20%	13.9%
21-50%	18.3%
51-100%	20.0%
101-200%	35.5%
201-400%	11.2%
Over 400%	1.1%

Figure 3 Standish Report: Time Overruns Rate

%percentage of Features /Functions	% of responses
Under 25%	4.6%
25-49%	27.2%
50-74%	21.8%
75-99%	39.1%
100%	7.3%

Figure 4 Standish Report: Functions Achievement Rate

Interaction failure: This failure means the usage of the output information system is not easy or convenient for end users. The complex usage doesn't mean that the system has a high quality. What the user need is the friendly user interface.

Complex system usage might be a result of compulsion that the customers don't want so but the group makes it so. For example, the customer wants that removing function should be done by button-click. If you do it by mouse-drag, this failure is interaction failure.

Expectation failure: This kind of failure means that the output information system doesn't match stakeholder's expectation. It cannot fulfill their requirements. In this failure, the manager always misunderstands the actual and desired situation of the stakeholder's group. These are the four notions of information system failures. The next the author will talk about the factors for a large number of failures.

### 3.2.2.3 Critical Failure Factors

Flowers defined information systems failures if any of these following situations occur: (Flower, S., 1996)

1. When the system cannot run as a whole system. It means that only parts of this system work and other parts are still with problems. Its overall performance cannot match the expectation.
2. When the output information system cannot match the original idea of customers. In this case, the information system is always rejected by users or customers.
3. When the benefit of the information system is less than its cost. If the company or organization (not include public welfare organization) cannot get profit from this development, this will be a failure of information system development.
4. If the problems are too difficult to solve, or the system is too complex to develop, or the management of the project is too difficult to do, information system development may be abandoned. An unfinished information system development is a failure.

Flower took a lot of information system development failure cases to find the factors in: organizational, financial, technical, human, and political factors, and the interaction among these factors. All of these factors can be mainly divided into groups. The first one is the organizational and managerial situation. The other one is the practical action of an information system development project. Possible failure factors in the organizational and managerial situation include hostile company culture, improper reporting structure, political pressures, vested interests, influences, and inappropriate level of management commitment. Key influencing factors in the practical action of the project itself include pre-occupation with technology in project planning, technology focus over human relations, complexity under-estimated, poor stakeholder management, poor consultation, design by the committee, and the technical fix for a management problem, poor competence of project management and project team, and poor selection decisions. (Yeo, K.T., 2002)

This is the introduction for a large number of failures. Actually this problem has some cross parts with the other two. The next general problem will be the inadequate alignment of information systems with business needs.

### 3.2.3 Inadequate Alignment of ISs with Business Needs

#### 3.2.3.1 Definition and Introduction

There is no universal definition of IT/IS alignment exists. Henderson and Venkatraman described IT/IS alignment as the degree of “fit” or the “support” to ensure the integration of IT into the business strategy by alignment within four domains: (Grant, Kevin, 2010)

- Business strategy;
- IT strategy;
- Organizational infrastructure;
- IS infrastructures and processes

Inadequate alignment of information systems with business needs is to make the information system development follow the direction of business strategies, goals and requirements. It is a two-way process. Both the information system and the business are the roles in this process. The alignment of information system with business needs is very important. The inadequate alignment will cause failures in the project.

The alignment is important for both theoretical and empirical studies. It ensures that information systems run to a right direction which is a critical point of successful business performance. The correct alignment can make sure that the functions of information system support the goals of organizations or companies. It also can enhance top managers' understanding in the importance of the information system. With the correct alignment, the project can run to the target directly instead of the waste of time and money. The correct alignment brings the competitive advantages and provides directions to react to new opportunities. This is the introduction for the alignment of information systems with business needs.

### 3.2.3.2 Factor Analysis

Here the author uses a table created by William Richard King (2009) to show factors of the alignment. (King, William Richard, 2009)

Factors Affecting Alignment

Authors	Study	Factors affecting alignment
PyBurn (1983)	Interviews with IS and senior managers from 8 organizations	Style of senior management decision making, volatility of business (and applications development portfolio), complexity of IS organization and management task, and status and physical location of the IS manager
Lederer and Mendelow (1989)	Interviews with IS executives in 20 firms	Top management mandate essential for coordinating business plan and IS plan. Alignment is difficult due to: unclear or unstable business mission, objectives, and priorities; lack of communications; absence of IS management from the BP process; and unrealistic expectations and lack of sophistication of user managers
Nath (1989)	62 IS managers and 46 general managers	IS managers identified: education of upper management in IS, upper management commitment to IS, and a strong set of organizational goals and objectives concerning IS.  General managers identified: education of upper management in IS, ability of IS management to keep up with advances in IT, and education of IS management in business goals and objectives.
Broadbent and Weill (1993)	Case study of 5 banks in Australia	Flexible and issue-oriented strategy formation process, extent and nature of the interaction between business and IS
Brown and Magill (1994)	Interviews + surveys of IS and general managers in 6	Importance of antecedents varies with the type of structure. Key antecedents: overall organization (e.g., corporate vision, corporate strategy, firm structure, culture-business unit

	multidivisional firms	autonomy, strategic IT role, and CIO role) and IS organization (satisfaction with management of technology, satisfaction with management and use of technology, gaps between current and future applications needs, locus of control). External environment (e.g., industry) was not found to be important.
Ward and Peppard (1996)	Conceptual paper	Culture gap between business and IT in terms of stories and myths, symbols, rituals and routines, control systems, organizational structures, power structures
King and Teo (1997)	Matched-pair survey of 157 business and IS planners	Seven benchmark variables (purpose of integration, role of IS function, primary role of IS executive, triggers for developing IS applications, top management participation in ISP, IS executive participation in BP, and the status of IS executive). Three showed weak relationship (performance criteria for IS function, frequency of user participation in ISP, and assessment of new technologies).
Teo and King (1997a)	Matched-pair survey of 157 business and IS planners	Organizational characteristics (information intensity of products/services, information intensity of value chain, top management's perceptions of IT importance, technical competence of IS executive) and environmental characteristics (dynamism, heterogeneity, and hostility) were not significant. Only business competence of IS executive was significant.

That's all for the theoretical part of the general problems in information system development and the reason analysis for each of them. In the next chapter, the author will start the empirical part and use the case company to verify the theory.



## 4 STUDY CASE: SENSO OY

The author has talked about the research plan, literature review and the fundamental knowledge. The author has declared three general problems in the information systems development: low productivity, large numbers of failures and the inadequate alignment of information systems with business needs. The author will start the empirical part and give a case company to verify this theory.

### 4.1 Company Introduction

Senso Solutions was established 2009 based on a restructuring of a Finnish technology and media corporation Rosendahl Digital Networks Oy (RDN). The company's founder Mr. Markus Rosendahl had a long background from the Fashion and Apparel industry where the Rosendahl's family-owned business had been operating since 1919. Senso provides a leading combination of industrial competence and background combined with the latest innovative spirit and knowledge of emerging technologies.

### 4.2 Company Size and Organization

Senso Corporation Headquarter is based in Hong Kong. Key subsidiaries are located in Finland (European Market) and the USA. Now, Senso is building subsidiaries in Africa. Within year 2011, Senso Corporation is opening several R&D Centers in various emerging markets. Its organization has a CEO and a global management with R&D division, commercial division and delivery division.

In this study case, the author will take the subsidiary in Hollola (in Finland) as the case company. There are more than 10 people in the subsidiary in Hollola. There is one chief executive officer, one chief operation officer, one area manager, one global marketing coordinator, one service manager and some programmers in this subsidiary.

### 4.3 Business Process

Senso is an IT-supplying company. Senso provides technology products to improve the efficiency of customers' businesses. The products have been built in cooperation with the world leading innovators and technology companies to find the best tools for business operations in the fast changing global business environment. Senso offers products in three categories: Senso Virtual Commerce, Business Management and Hardware. Senso offers services in six categories: consulting, implementation, integration, training, software services and media services. Senso also provides full solutions to operate the entire value chain. Manufacturing, logistic operations, wholesale and retail sales can benefit from the tools provided by Senso. Visibility, real time information flow and accuracy are the key advantages provided by the leading tools of Senso Solutions.

Senso also develops information systems for their own uses. The author will give you the case project of Senso for their own information system development in the next chapter.

### 4.4 Information System Development Case Project

Senso started a project called Website Development in September of 2011. This project aimed to update the website of their front page with a new user interface and more functions. There were five members in this project group which included one project manager, one IT-supporter, two programmers and one tester. Even though this was a project group, the five members were not in the same place. The project manager, one programmer and the tester were in Hollola. The other programmer was in China. The IT supporter was in Vaasa. This project contained five stages: planning, designing user interface, making the website, testing and redesign and implementing.

First of all, the project manager made a project plan. He declared the process, budget, timetable, requirements and responsibilities for each member. Then one programmer designed the user interface by Photoshop. Actually, this programmer

was the author. The author marked every detail of the user interface such as the size of the picture, the space between two icons, font family, color and size and so on. After the designing, the author sent the interface to both the project manager and the IT-supporter to make sure if it was available for the future work. The next, the two programmers and the IT-supporter started to work in programming and designing with a web development tool-Joomla. After the core working, the tester went through his testing and sent bugs back to the programmers to redesign the website. Finally, the project manager updated the new website.

This is the basic process of the project. The five members contained two student trainees: One programmer (that's the author) and the tester. Even though this was a small project, the problems were everywhere, such as the low efficiency, inconvenient communication, the wrong direction of the development and the inadequate alignment with business needs. One factor of problems was that the two trainees were not professional. But the key reason was that they lacked knowledge in information system development and in project management.

#### 4.5 Case Project Data Collection

The author took a participant in this project. The author picked up some short diaries of one trainee as the data. These diaries are about Joomla template designing. Here the author does not list them by days. The author just shows them as a story.

In the first day the author had done the structure of the website. The author made some changings for the search field and the space between two logos in the right-down corner. The author also added some links for some elements. The next day, the author had tried out the drop-down menu function in the sample template. But it cannot be used in the standard template. There should be some script bugs. Otherwise, the functions of search button had been done. On the third day, the author took a new method to achieve the drop-down menu. The Joomla template had been updated but sub-menu links function failed. The next, the author had done the sub-menu function without icons and had changed the background picture by the Photoshop. In the next work day, the author achieved the function that the

articles were in a new line. Most time the author was confused in the background of the drop-down menu. But the author found the components and modules were quite convenient for these functions. And the author learnt how to install these components and modules. After that, the author made the menu worked with the new component. The only problem was how to set the background. So, the author asked Tank who was a professional programmer in the Senso. And the author downloaded some other components and the one called Ninja simple icon menu can achieve the icons-link function. As Tank said that in the old version, there was new tools can achieve this function. The author designed the front page of "region select". And the author installed the Joomla in server. The template part was almost finished. The last day of template designing, the author had a video meeting with Tank and Mr. Zhang. They decided some details for this template. Some part was not very standard and need to change.

#### 4.6 Theory in Case Project analysis

The author has talked about the case project in the last sub-chapter. In this chapter, the author will illustrate how the theory works and analyze the factors for the problems in the case company.

First of all, let's have a review at these three general problems in the information system development: low productivity, large numbers of failures and the inadequate alignment with business needs. These three general problems almost cover all the problems in this case project. In the continuous part, the author will analyze them in the order of these three general problems.

The first category is low productivity. Everything begins with a plan. If the plan is not an efficient one, the whole project cannot be an efficient project. In the case project, the author could find the project plan on Google Document. That was not a completed plan. It lacked the introduction of project steering group and technology presentation.

The first reason for low productivity is non-competence. As the author said there were two trainees in this group. But these two trainees didn't get any training before starting this project. This project was website development. It needed the PHP and JQuery skills as the support. When they started the project, they didn't know what to do and how to do the project.

The second reason for low productivity is unclear productivity standard. Even though the members wanted to work more efficiently, they didn't know what the basic standard was. From a whole schedule point of view, everyone knew that how much time this project should use. But there was not detailed timetable and milestones. This unclear productivity standard caused low productivity in this project.

The third reason for low productivity is the work process. The work process was not clear for people. The whole structure was there and everyone knew that. As mentioned in the last sub chapter, the five members were located in three different places. Even though the Internet can help members to communicate easily, they cannot get the immediate reply when he or she was not with computer online. How to deal with the details of each small task made the work process unclear. So, in this case project, the work process was a factor for low productivity.

The fourth reason for low productivity is poor team project management. The same situation with the previous reason, how did the only one manager work with the group members who were in other two places? This was one problem in management. And management failed to use problem solving processes which could fulfill this need. The team members were not only doing this project. They were also participating in other projects. Mixed responsibilities and management caused low productivity.

The fifth reason for low productivity is lack of motivations. The professional programmer of this group was not very interested in this project. Instead, most things were done by the trainees. The ability of trainees was limited. When the trainees faced problems, it took the trainees lots of time to solve them. This took too

much time and caused low productivity immediately. In this case project, the lack of motivations was also a reason for low productivity.

The last reasons for low productivity are complex tools and mixed maintenances. In this case project, the main tools were Joomla and code editor. The code editor was very clear to developers, but the Joomla was totally new for the trainees. As we can see in the following picture, Joomla had lots of controls and it was not an easy tool which you can learn within a short time.

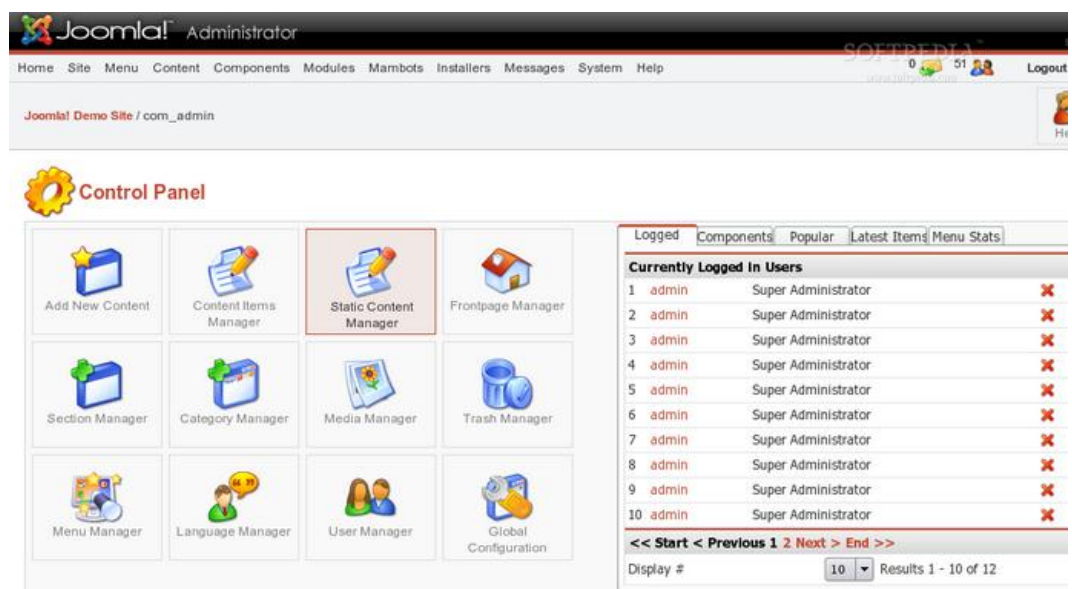


Figure 5 Joomla Tool

The second category is a large number of failures. In this case project, the author could not say how many projects failed. But the factors can be used to analyze why failures happen.

The first reason for a large number of failures is lack of literature in general. Not all the members of this group were professional. The two trainees didn't have the experience in website development and the company didn't supply any materials for them to get familiar with the project.

The second reason for a large number of failures is lack of evaluations. There were evaluations in this case project. But as mentioned before, those who have the will to evaluate the project are always lack of resources and capacity. Those who have the

resources always lack the will to evaluate. In this group, the project manager was responsible for evaluation, but the manager didn't have the professional knowledge in programming and website development. This caused the project failure in the information system development.

The third reason is process failure. The budget was not a problem because they paid nothing to trainees and the other members didn't focus on this project very much. In another words, the project was almost for trainees. However, the project became obsolete which should be finished in two months. Until the author finished the practical training, the project was still in progress.

The next reason can be called as interaction failure. This failure has some cross parts with the reason, tools and maintenance in a low productivity category. As the picture in figure 6 showed, the interaction was too complex for freshmen.

The last failure is expectation failure. Even though the project was not ended when the author left, but the uncompleted versions always could not meet customers' requirements. Expectation failure is perceived as the difference between the actual and desired situation for the members of a particular stakeholder group. The functions that the manager assigned to the trainee were somehow difficult to achieve. Both of these two factors caused expectation failure.

The final category for the general problems in the information system development is the inadequate alignment of information systems with business needs. The author only found one phenomenon about this failure in the case project. There was a function that the website should use both icons and letters. Under the Joomla tool background, the author chose the component called Ninja Simple Icon Menu. This component can achieve the requirements, but the author got another task when the author had completed this one. The new task was to translate everything into another language. In this case, this component could not achieve this requirement at all. Both the manager and members need strategy insight during the project process.

There were also some other problems not mentioned in this study case. But most problems found in this study case can be divided into these three categories. That's all for the theory used in the case company.



## 5 CONCLUSION

Based on the theory and the case analysis, the general problems in information system development are low productivity, large numbers of failures and the inadequate alignments of information systems with business needs.

In the information system development, the project always faces problems. In this thesis, the author has got the idea what the general problems are and why these problems happen. We can make some changes and improvements to avoid these problems. If members lack knowledge, some training should be taken before the project. If communication is not convenient, the solutions should be prepared before the project. And if members don't have the idea and experience, some interviews should be taken in the other companies before the project.

Information system development needs integrated skills and wide knowledge. Professional knowledge is not enough for development. Developers need management knowledge as well. Human resource management knowledge can help the company manage and motivate people. Financial management knowledge can help the company calculate the budget. Customer relations and marketing knowledge can help the output system meet customers' needs. It is very important to improve development.

All in all, applying the knowledge of information system development into work life can make the development towards achieving goals easier and improve the success rate of information system development.

## 6 DISCUSSION

This thesis is based on the literature review and practical training experience. As to the research problem, what are the general problems in information system development, the problems mentioned in this thesis cannot cover all the problems in the development lifecycle. Some other problems may not be mentioned in this thesis.

The theory is based on Tolvanen (1998). Reliability is relatively high. But as time moves forward, some problems may be solved easily and some other new problems may come. The general problems can be redefined in the future with the high-speed growth of technology. The author needs to consider this in future research as well. Otherwise, the author's research range is not wide enough. This also affects the reliability.

Information system development needs integrated knowledge. Developers can use project management knowledge, risk management knowledge, human resource management knowledge and some other knowledge to increase the success rate of information system development.

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